Section # 4

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To Do

- Adverse selection and "The Market for *Lemons*"
- Rothschild-Stiglitz Model
- 5 min survey

Definition

Adverse selection:

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→ What type of problems does this create?

→ Specifically in healthcare?

Lemons in Health Insurance

- People have **health** $h \sim \mathbb{U}(0,1)$ where, the higher the h the healthier the person is. Their medical expenses are $(1-h)$.
- Insurers post an **insurance price** P promising to cover all medical expenses.

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Q: What is the source of *asymmetric information* in this example?

A Lemon Market: Insurers

Q: Insurer's expected profits from selling insurance is...?

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$$\underline{P} = \frac{1}{2}.$$

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- Note that for $h > \frac{1}{2}$, $\overline{P}(h) < \frac{1}{2} \leq \underline{P}$ and so **types $h > \frac{1}{2}$ are not going to participate in the insurance market**.

A Lemon Market: Insurers - update

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$$\Delta\mathbb{E}\left[\Pi^I\right] = P - \int_0^{\frac{1}{2}} (1-h)dh = P - \frac{3}{4}.$$

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- But insurers realize this before setting their price and so their *real* expected profits are...?

$$\Delta\mathbb{E}\left[\Pi^I\right] = P - \int_0^{\frac{1}{2}} (1-h)dh = P - \frac{3}{4}.$$

- Meaning the (updated) lowest price they are willing to sell insurance at is:

$$\underline{P} = \frac{3}{4}.$$

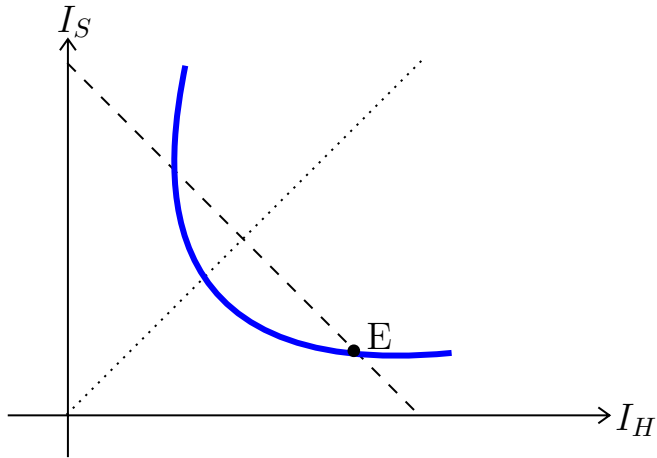
A Lemon Market: Buyers - update

- Recall $\Delta U^P(h) = \max\{-(1-h), -P\}$ and people of type h are willing to spend at most $\overline{P}(h) = 1 - h$.
- Thus, we have an (updated) excluded group: all types $h > \frac{1}{4}$, will be willing to at most $\overline{P}(h) < \frac{3}{4} \leq \underline{P}$ and so **types $h > \frac{1}{4}$ are not going to participate in the insurance market.**

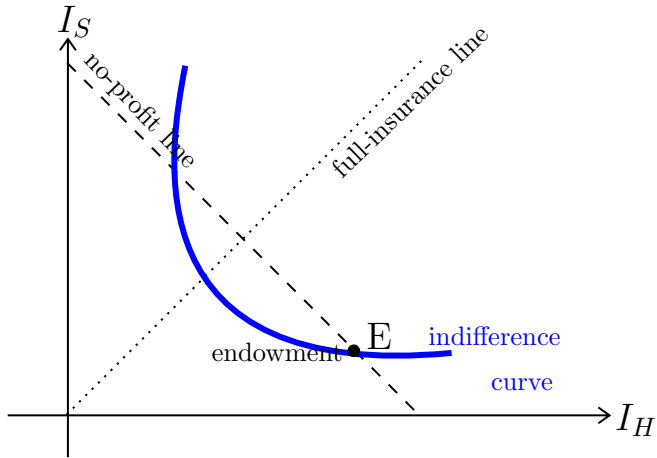
A Lemon Market: Buyers - update

- Recall $\Delta U^P(h) = \max\{-(1-h), -P\}$ and people of type h are willing to spend at most $\overline{P}(h) = 1 - h$.
- Thus, we have an (updated) excluded group: all types $h > \frac{1}{4}$, will be willing to at most $\overline{P}(h) < \frac{3}{4} \leq \underline{P}$ and so **types $h > \frac{1}{4}$ are not going to participate in the insurance market.**
- This goes on and it is easy to see that at the end of this iterative process **nobody will want to participate in this market.**

Rothschild-Stiglitz in Figures, 1

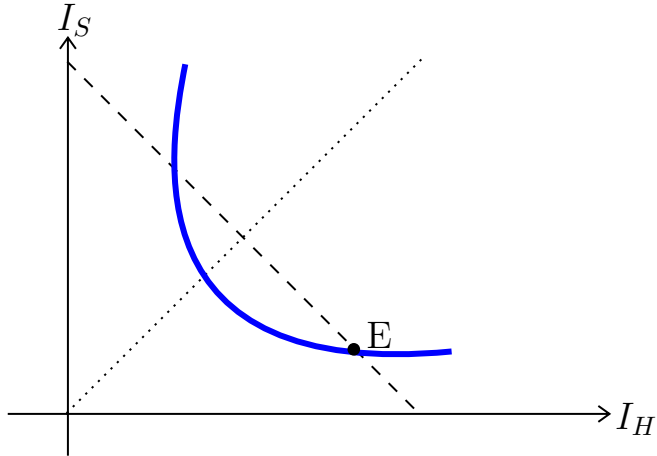


Rothschild-Stiglitz in Figures, 1



Rothschild-Stiglitz in Figures, 2

Q: Which parts of the plot can we exclude? I.e. where are insurers and buyers not going to agree?



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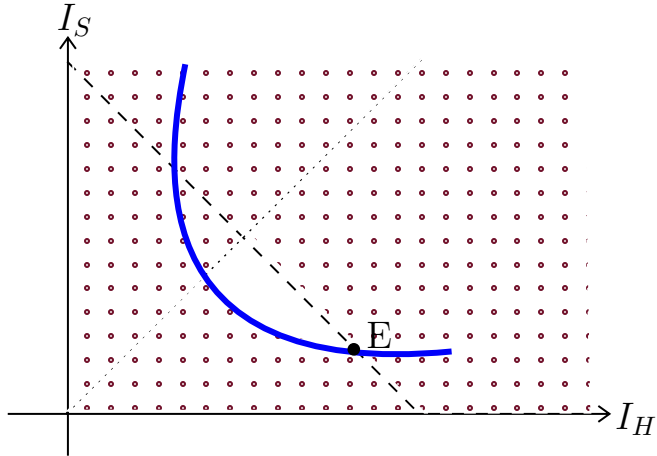


Rothschild-Stiglitz: Pooling Equilibrium

An **equilibrium** must satisfy:

1.
2.
3.

Rothschild-Stiglitz: Pooling Equilibrium

An **equilibrium** must satisfy:

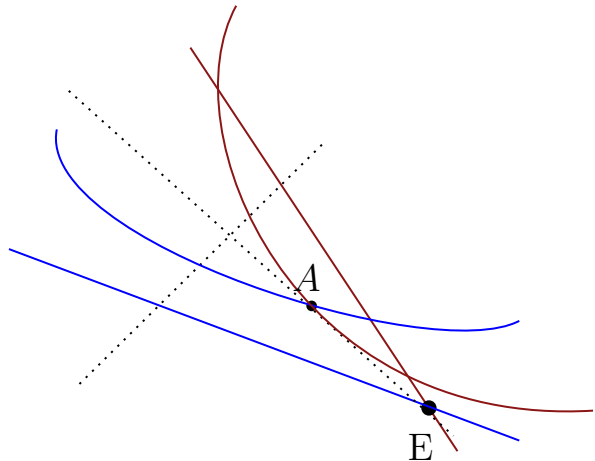
1. **Utility maximization:** Buyers choose the contract that gives them most utility
2. **Profit maximization:** Sellers offer a contract that gives them the most utility.
3. **Free entry:** There does not exist a contract outside equilibrium that buyers would like and gives the seller non-negative profits.

Rothschild-Stiglitz: Pooling Equilibrium

Q: What is a **pooling equilibrium**?

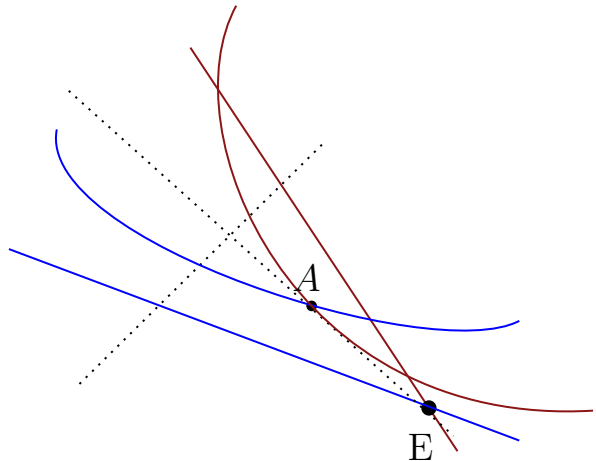
Rothschild-Stiglitz: Pooling Equilibrium

Q: Is A a contract both parties are willing to accept?



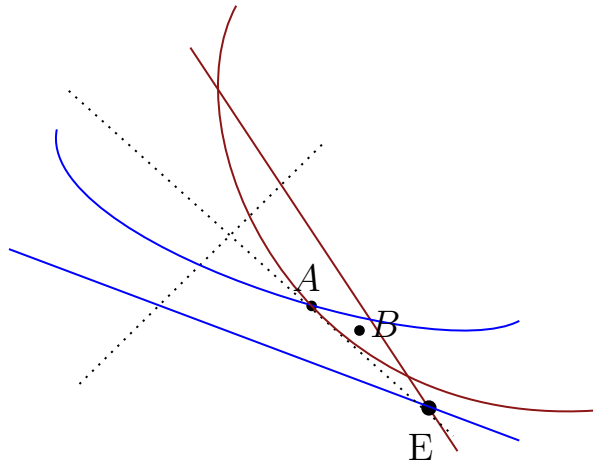
Rothschild-Stiglitz: Pooling Equilibrium

Q: Is A an equilibrium?



Rothschild-Stiglitz: Pooling Equilibrium

Q: Is A an equilibrium? $\rightarrow$ No! Because of B!

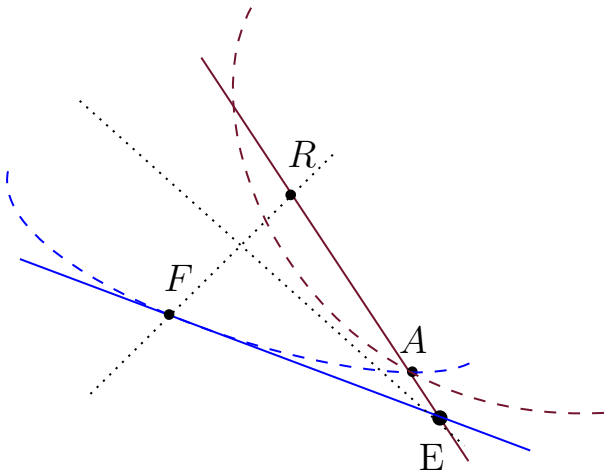


Rothschild-Stiglitz: Separating Equilibrium

Q: What is a **separating equilibrium**?

Rothschild-Stiglitz: Separating Equilibrium

Q: Is A an equilibrium?



Rothschild-Stiglitz: Separating Equilibrium

Q: Is A an equilibrium now?